

CLAIMS

1. An apparatus for creating a molecular array comprising:
- a base;
 - a Z controller operably connected to the base wherein the Z controller is selectively positionable along a Z axis;
 - a deposition probe removably and operably connected to the Z controller so that the deposition probe is selectively positionable along the Z axis by the Z controller;
 - an X, Y controller operably connected to the base wherein the X, Y controller is selectively positionable along an X axis and a Y axis, the X, Y controller further comprising a deposition substrate operably attached thereto and wherein the movement of the X, Y controller moves the deposition substrate between a first position and a second position, the second position being operably positioned relative to the deposition probe; and
 - an X, Y translation stage operably connected to the base wherein the X, Y translation stage is selectively positionable along an X axis and a Y axis, the X, Y translation stage further comprising a loading substrate operably attached thereto and wherein the movement of the X, Y translation stage moves the loading substrate between a first position and a second position, the second position being operably located relative to the deposition probe.
2. The apparatus of claim 1 further comprising a control computer.
3. The apparatus of claim 2 further comprising a humidity controller operably attached to the base wherein the humidity controller controls the humidity around the deposition probe.
4. The apparatus of claim 3 wherein the humidity controller is operably connected to the control computer.
5. The apparatus of claim 1 wherein the Z controller has an approximately 200 nanometer spatial resolution along the Z axis

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6. The apparatus of claim 5 wherein the X, Y controller has an approximately 20 nanometer spatial resolution along the X and Y axes.

7. The apparatus of claim 1 wherein the loading substrate further comprises one or more deposition materials deposited thereon.

8. The apparatus of claim 1 further comprising an optical microscope operably attached to the base.

9. The apparatus of claim 2 further comprising a force feedback monitor.

10. The apparatus of claim 2 wherein the deposition probe further includes a tip.

11. The apparatus of claim 10 further comprising a humidity controller, the humidity controller selectively controlling the humidity of the air around the tip.

12. The apparatus of claim 2 wherein the control computer further comprises a stepper motor control card.

13. The apparatus of claim 12 wherein the humidity controller further comprises a dry gas source, a humidity source, and a gas flow monitor.

14. A method for creating a deposition domain comprising:

(a) obtaining a loading substrate, the loading substrate further including a deposition material;

(b) loading the deposition material onto a deposition probe by altering the humidity level around the loading substrate and the deposition probe to create a capillary bridge; and

(c) creating a deposition domain on a deposition substrate by transferring a desired amount of the deposition material from the deposition probe to the deposition substrate.

15. The method of claim 14 further comprising repeating steps (a) through (c) to create an array.

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16. The method of claim 14 wherein placing the loading substrate further comprises affixing the loading substrate onto an X, Y translation stage to move the loading substrate to a position relative to the deposition probe.

17. An apparatus for creating an array comprising:

a Z controller

a deposition probe operably attached to the Z controller, the deposition probe further comprising a tip;

an X, Y controller operably attached to the Z controller; and

a deposition substrate operably affixed to the X, Y controller where the deposition substrate is selectively movable between a first position and a second position and wherein when the X, Y controller moves the deposition substrate to the second position the deposition substrate is operably positioned relative to the tip.

18. The apparatus of claim 17 further comprising:

a control computer operably connected to the Z controller and the X, Y controller;

a force feedback monitor operably affixed to the deposition probe and operably connected to the control computer; and

a humidity controller operably affixed to the Z controller and operably connected to the control computer.

19. The apparatus of claim 20 further comprising an ozone source for cleaning the deposition probe.

20. An apparatus for creating a deposition domain comprising:

an X, Y and Z controller;

a loading substrate operably and movably attached to the Z controller;

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a deposition substrate operably and movably attached to the Z controller;

a deposition probe operably attached to the Z controller; and

a humidity controller operably attached to the Z controller wherein the humidity controller selectively controls the humidity level around the deposition probe, the loading substrate, and the deposition substrate.

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